

4. OPERATIONAL CONCEPTS AND SCENARIOS

The term “operational concept” generally means “how a system is used in various operational scenarios”. “System” is used here in a broad sense to include people and manual processes as well as automated information, sensor and control systems. New operational concepts are adopted in order to solve a problem in the current operations or to take advantage of new knowledge or technology that enables improvements in current operations.

The operational concepts are related to the guiding principles developed by the stakeholder community. The concepts were derived by first analyzing the user services that discuss how to improve commercial vehicle operations, then interpreting the stakeholder-developed guiding principles, and finally applying knowledge about the state of existing and emerging technologies. The combination of the desired commercial vehicle operations improvements, guiding principles about making those improvements, and the reality of technological advances are reflected in the operational concepts.

CVISN Credentials Administration operational concepts include all aspects of applying for, reviewing, and granting commercial vehicle credentials; filing tax returns on fuel taxes; paying the associated taxes and fees; managing information about credentials and tax payment status; and conducting other state, regional, and federal administrative functions associated with those activities.

Many stakeholders are interested in and concerned with the operational concepts relating to how they will conduct their business. The concepts that support credentialing are designed to complete the credential life cycle electronically. Information necessary to carry out credential administration would be captured, processed, and stored electronically and made available to authorized users over commercially available communication networks. Standard snapshots and reports would be available to review and evaluate the carrier’s safety performance and credentials.

4.1 Key Operational Concepts

The *CVISN Operational and Architectural Compatibility Handbook (COACH) Part 1*, Operational Concept and Top-Level Design Checklists (Reference 2), provides a comprehensive checklist of key operational concepts relating to Credentials Administration. The operational concepts should be used to guide the state design process. The credentials administration operational concepts stated in the COACH Part 1 are repeated and further explained here.

- Credential applications and fuel tax returns are filed electronically from Commercial Vehicle Operations (CVO) stakeholder facilities. Carriers may use a Web browser to fill in electronic forms at a state World Wide Web site. Another choice is that the carrier uses a credentialing software package to support electronic credentialing and tax filing. One example of this kind of package is a stand-alone personal computer (PC) product referred to as CAT (Carrier Automated Transactions). A third option is

that the credentialing software is integrated with other carrier operations systems. In all cases, the credentials information is submitted electronically to some state-controlled system.

- Internal state administrative processes are supported through electronic exchange of application data, safety records, carrier background data, and other government-held records. Information exchange is enabled through the use of standards. Many elements of CVO require information about the credentials history for carriers and vehicles. Collecting the most-used information into standard messages simplifies systems since interfaces can be defined once, rather than negotiated between every pair of stakeholders. Credentialing actions may be based, in part, on a review of the safety information available from snapshots. The support of internal administrative processes rests on fostering a communications infrastructure that allows the state to collect data electronically so that it can be passed on to the state's own processing software and data bases with little or no

manual intervention. A typical example might be when a carrier's safety record is evaluated during the vehicle registration process using the Performance and Registration Information Systems Management (PRISM) approach. PRISM is a program sponsored by the Federal Highway Administration (FHWA) that seeks to improve safety by linking vehicle registration to acceptable carrier safety performance. An explanation of the relationship between PRISM and CVISN is provided in Section 8. Reference 15 provides more information on PRISM.

- IRP and IFTA base state agreements are supported electronically. The International Registration Plan (IRP) and International Fuel Tax Agreement (IFTA) Clearinghouses were developed to provide electronic support for the exchange of financial information to support IRP and IFTA. The IRP and IFTA Clearinghouses are both operational.
- Credential and fuel tax payment status information for interstate operators is made available electronically nationally to qualified stakeholders. Making the information

Key Operational Concepts for Credentials Administration

- Electronic credentialing & tax filing
- State administrative processes supported by electronic information exchange
- Base state agreements supported electronically
- National electronic access to interstate credentials information
- Access to data controlled
- Able to correct errors
- Fees paid electronically
- Electronic access to administrative processes available from public sites
- Status information available electronically to qualified stakeholders
- Carrier audits use electronic support
- Paperless vehicle concept

available electronically exploits the value of collecting and processing the information electronically. Credentials information is made available through the carrier, vehicle, and driver snapshots maintained by the Safety and Fitness Electronic Records (SAFER) system. While the SAFER credentials information may not be up-to-the-minute, it provides a useful window into credentials information for interstate operators. For absolutely current information, users must contact the authoritative source.

- User access to data is controlled (restricted and/or monitored) where necessary. Information sharing within a single jurisdiction and across jurisdictions using electronic networks is a cornerstone of the Intelligent Transportation Systems (ITS)/CVO initiative. Information systems are only as good as the quality of the data they use. Data must be accurate, current, and safe from tampering or unauthorized disclosure. Authoritative sources are the official repositories for the data. Some information will be sensitive and not all stakeholders can be allowed to have it. The systems must include techniques for controlling access to information so that inappropriate disclosure does not take place.
- Mechanisms are made available for operators to dispute credentials records held by government systems. If errors exist in government-held records pertaining to credentials, standard procedures must be available to note and correct the error.
- Fees and taxes are paid electronically. Electronic commerce allows government administrative systems to streamline the base state agreements, exchanging fees and taxes for interstate operators. Applicants should also be able to pay credential and tax fees via electronic funds transfers (EFTs), debit cards, credit cards, or other electronic means.
- Electronic access to administrative processes and information is available from “one stop shops” in public sites. States or commercial vendors can provide kiosks for carriers who do not own the appropriate computer and communications hardware or software to otherwise access the electronic credentialing capabilities offered by the state. Access to administrative processes and information can be provided via the World Wide Web.
- Credential and fuel tax payment status information for intrastate operators is made available electronically to qualified stakeholders throughout the state. Just as information about interstate operators should be accessible nationwide, information about intrastate operators should be accessible within the state. The use of snapshots provides a common method for sharing key data, whether for intrastate or interstate operators. For the concept to work, some state system equivalent to CVIEW must maintain snapshots for intrastate operators.
- Carrier audits are accomplished with electronic support. Supporting conduct of carrier audits refers to two functions: permitting state administrators to perform electronic scans of state records in selecting candidates for audits, and permitting auditors access to state and carrier records on a particular carrier during the actual conduct of an audit of that carrier.

- The “paperless vehicle” concept is supported; i.e. electronic records become primary and paper records become secondary. Electronic access to credentials information makes it possible to contemplate no longer requiring commercial vehicles to carry copies of credentials and decals on-board. Instead, credentials would be checked and verified electronically. The concept is to support the complete credential life cycle electronically: application, fee payment, credential issuance, revenue distribution, modification, renewal, audit, sanctioning, appeals, and inspection. Data exchanges between the public and private sector are accomplished using formats and protocols defined in open standards. Paper could be produced from the electronic information if and when required.

4.2 Credential Life Cycle

At a relatively abstract level all credentials follow a similar administrative path, which we refer to as the "**credential life cycle**." The recognition of similarity in credentials processing allows unified design of credentialing data interfaces and automated processes. Regardless of the CVO credential involved, many of the processes and functions are the same. Stakeholders in the administration of credentials and the collection of fuel taxes take the following steps.

- **Application** – A user (an "applicant") typically initiates the credentials process by filing an application requesting a particular credential. Often, it is not practical to handle the initial application process electronically. For example, for initial vehicle registration in a new jurisdiction, the new state usually requires that the old license plates must be turned in – a manual process. Also, to embark on electronic credentialing, the state and applicant must establish trading partner agreements, a process that usually involves paper documents and physical signatures. So, electronic credentialing usually starts with renewals or modifications (“supplements”) to the initial application.
- **Fee Payment** – Applicants must usually pay a fee, ranging from a nominal administrative charge to a substantial fee or tax, in order to receive a credential. The amount due may be a fixed fee or (as in the case of some taxes) may require complex algorithms to determine.
- **Issuance** – Upon furnishing a proper application and paying the required fee, an applicant receives the credential certifying that these requirements have been met. The credential may be a certificate, a sticker, a stamp, or a plate, and in the future it may be a remotely accessible electronic record. In some cases, the state may issue controlled credential stock to a trusted agent, and allow the agent to print the actual credential.
- **Revenue Distribution** – When a jurisdiction acts as a base state it collects fees and taxes for all other participating jurisdictions within which the applicant will operate. These collected funds must be properly disbursed to the other jurisdictions, together with records that allow tracking funds, and permit each jurisdiction to determine whether carriers and vehicles are properly registered to operate within its borders.

- **Modification** – Most systems for administering credentials include some method for modifying information on record to reflect changes in an applicant's circumstances. Depending on the nature of the change, the applicant may be required to remit additional fees, no fee, or be entitled to a refund.
- **Error Correction** – Jurisdictions must provide some method for applicants to review and correct credential-related information held by the jurisdiction. State or Federal freedom of information legislation may apply.
- **Renewal** – Almost all credentials have a finite period of applicability after which they must be renewed if they are to remain valid.
- **Audit** – Most systems for administering credentials have some provision for physically checking historical records of selected applicants to verify that information used to secure credentials is accurate.
- **Sanctions** – Systems for administering credentials provide for sanctions of applicants who fail to properly register and pay fees as required. Possible sanctions include levying fines, placing vehicles out of service, revocation of a carrier's authority to operate, and prosecution.
- **Appeals** – Most systems for administering credentials provide applicants a mechanism to appeal fee determinations and sanctions that they believe to be incorrect or unjustified.
- **Roadside Inspection** – Credentials are distributed (in paper or electronic form) so that regulatory agents and law enforcement officers can establish whether or not vehicles operating in their jurisdiction have properly obtained all required credentials.

Starting with this basic life cycle in mind, it is often easier to see the common processes and establish common design approaches as operational scenarios for particular credentials are developed.

4.3 Operational Scenario

The expected benefits resulting from applying the credentialing concepts are more efficient and responsive administrative processes for carriers and government agencies. It has been estimated that the cost of compliance with regulations for both carriers and government may be as high as \$6B annually. Prior to CVISN deployment, the estimated time to register a vehicle in the state of Maryland, from start to finish, finish being defined as when the vehicle is legal to operate, was reported to be 4 to 7 business days. This time has been reduced to roughly 15 minutes per vehicle.

A state must develop or otherwise acquire new systems and modify some existing systems to implement the CVISN Level 1 capabilities. There are many ways to do this and still be in conformance with the architecture and standards. Chapter 6 illustrates several approaches to electronic credentialing that are consistent with the architecture.

Regardless of the design approach chosen, all states need to model their intended business processes in a way that is easy for all stakeholders to review and understand. The functional thread diagram is the tool recommended to illustrate operational scenarios.

This section depicts an example functional thread diagram. The scenario chosen is one of the CVISN Level 1 capabilities. **The high-level CVISN Level 1 operational scenarios related to Credentials Administration functions are listed below:**

- accept and process electronic IRP credential applications for supplements (e.g., adding a vehicle to an existing account)
- accept and process electronic IRP renewal applications
- accept and process electronic IFTA credential applications for supplements (e.g., changing ownership)
- accept and process electronic IFTA renewal applications
- accept and process electronic filing of and payment for IFTA quarterly tax returns

For each of the scenarios, it is sometimes useful to divide the steps in the scenario into these three subgroups:

- interact with the applicant electronically
- maintain snapshots for interstate operators by providing credential data for carriers and/or vehicles based in your state to SAFER
- connect to the appropriate clearinghouse to support the base state agreement

It is often more convenient to test the implementation of the scenarios in the shorter subgroups of steps.

The operational scenarios related to enrolling in one or more electronic screening programs are included in the *CVISN Guide to Electronic Screening*, Reference 10.

The example operational scenario illustrates the first operational scenario in the list: an IRP Supplement for a carrier adding a vehicle to its fleet. The method used to demonstrate the scenario is called a “functional thread diagram.” The activities in the scenario are listed as steps. To differentiate between different time schedules, numbers are used to show the interaction between the applicant and the state, and the state’s update of snapshots. Those interactions occur as soon as possible after the supplemental application is received by the state. Letters are used to show the state’s connection to the IRP Clearinghouse, since that occurs at a regular period instead of being triggered by the carrier’s supplemental application.

A diagram corresponding to the steps listed is presented in Figure 4–1 for a graphical view of the scenario. The lines represent data flow between products, with arrows indicating the direction of flow. Each line is labeled with a number or letter. The complete set of lines constitutes a thread of activities that accomplish a function. Hence, the diagram is called a “functional thread diagram.”

The IRP Supplement “Add Vehicle” scenario addresses three areas: transactions between the motor carrier and state agencies, transactions among agencies within the same state including the update of snapshots, and transactions among state agencies and the IRP Clearinghouse. This example is loosely based on Maryland’s design. The state uses a commercial product to support IRP processes. The state has contracted the implementation of a Credentialing Interface (CI) software package to interact with the carriers’ credentialing software. In this example, the carrier uses a CAT product whose development is being sponsored by the state. The state is also implementing a CVIEW software package to provide snapshot segment updates to SAFER. Please see Reference 14 for more information about snapshots.

4.4 Example Operational Scenario: IRP Supplement, Add Vehicle

1. Carrier enters an IRP credential application via a Carrier Automated Transaction (CAT) system which submits it to the Credentialing Interface (CI) as an EDI X12 TS 286.
2. The CI submits a query to its state database to perform preliminary checks as part of evaluating the application.
3. The state database reports the status, i.e., flags and condition to the CI.
4. If a satisfactory status is received, the application is sent to the IRP system for processing via EDI X12 TS 286.
5. The IRP system processes the application and sends an invoice notice to the CI via EDI X12 TS 286.
6. The CI sends the invoice notice to the CAT via EDI X12 TS 286 and maintains archival/audit copies of all transactions.
7. The carrier reviews the invoice data and verifies that the application data matches the intent. The CAT sends payment method information to the CI via EDI X12 TS 286.
8. If a Temporary Authority (TA) is requested, the CI releases it to the CAT via EDI X12 TS 286.
9. If a TA was granted, the CI sends a vehicle snapshot segment update to CVIEW via EDI X12 TS 285.
10. CVIEW sends updated snapshot data to SAFER via EDI X12 TS 285.
11. CVIEW sends updated snapshot data to Roadside via EDI X12 TS 285.
12. SAFER sends updated snapshot data to subscribers via EDI X12 TS 285.
13. The CI verifies payment method information (financial system interfaces are not shown) and passes payment approval to the IRP system via EDI X12 TS 286.
14. The IRP system validates payment amount and updates application status to indicate the permanent credential granted and notifies the CI via EDI X12 TS 286.

15. The CI passes the permanent credential to the CAT via EDI X12 TS 286. Cab Cards may be printed in the carrier's office or state office.
 16. The CI updates CVIEW with permanent credential information via EDI X12 TS 285.
 17. CVIEW sends updated snapshot data to SAFER via EDI X12 285.
 18. CVIEW sends updated snapshot data to Roadside via EDI X12 285.
 19. SAFER makes updated snapshot data available to subscribers via EDI X12 TS 285.
- A. Periodically (daily), the IRP system sends updates to the IRP Clearinghouse on IRP registration information and fee payments (recaps).
 - B. Monthly, the IRP Clearinghouse makes available the fee information (pre-netting transmittals) to the participating jurisdictions for approval and/or correction. Today, the states review the information interactively using terminals. In the future, it may be possible to receive the transmittals using EDI TS 286. If an EDI interface is provided, the interaction will occur with the CI.
 - C. The IRP Office and also other participating jurisdictions report back to the IRP Clearinghouse the approvals or corrections. Today, the approvals/corrections are made via terminals. In the future, it may be possible to use TS 286. If an EDI interface is provided, the interaction will occur with the CI.
 - D. The IRP Clearinghouse performs the actual netting and makes available corrected/approved vehicle and fee actions (post-netting transmittal) and netting results (remittance netting reports) to the participating jurisdictions. Today, the information is reviewed via terminals. In the future, it may be possible to use TS 286. If an EDI interface is provided, the interaction will occur with the CI.

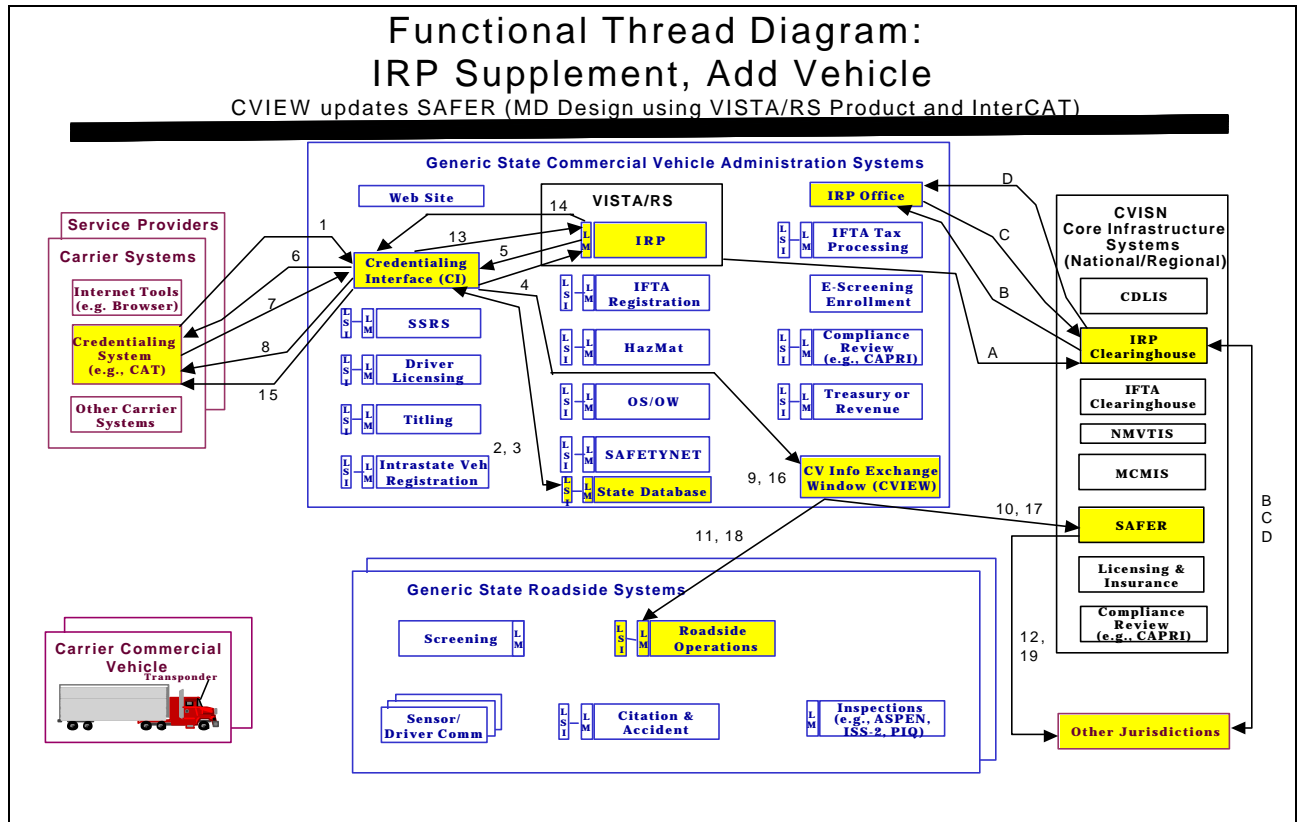


Figure 4-1. Functional Thread Diagram: IRP Supplement, Add Vehicle

NOTE: Functional acknowledgment for all EDI messages (except TS 997) is made by responding with a TS 997. Content errors in a received TS 286 are noted by also replying with a TS 286. The results of processing an incoming TS 285 are reported via TS 824.

Additional examples of operational scenarios and functional thread diagrams are in Appendix C. They are included for reference, and as starting points for states that plan to implement similar processes.

A list of scenarios geared to interoperability testing CVISN Level 1 capabilities is shown in Table 4-1. The list shows details such as different kinds of supplemental credentials. Interaction between the state and the clearinghouses is listed separately from interaction between the state and the carrier for testing purposes. Error handling scenarios are not included in the table, but must be addressed as part of the design process. A state may need to add scenarios to address additional functions. More information about interoperability testing can be found in Section 7 and in References 6, 26-28, and 65.

**Table 4–1.
Credentials Administration Scenarios for
Interoperability Testing**

Scenario
<i>Accept & process electronic IRP credential applications</i>
* IRP Supplemental: Add Vehicle - <i>pairwise and end-to-end</i>
* IRP Supplemental: Add Jurisdiction - <i>end-to-end</i>
IRP Supplemental: Delete Vehicle
IRP Supplemental: Change Unit Number
IRP Supplemental: Change Weight
IRP Supplemental: Replacement Credential
IRP Supplemental: Transfer Plate
* IRP Renewal - <i>end-to-end</i>
IRP Trip Permit
<i>Reconcile IRP fees state-to-state through IRP Clearinghouse</i>
IRP Pre-Netting Transmittal
IRP Post-Netting Transmittal
IRP Remittance Netting
IRP Recaps
IRP Recap Correction
<i>Accept & process electronic IFTA credential applications</i>
IFTA Supplemental: Change Ownership
IFTA Supplemental: Add Jurisdiction
* IFTA Renewal - <i>pairwise and end-to-end</i>
IFTA Trip Permit
<i>Transmit IFTA information from carrier IFTA credential application to IFTA Clearinghouse</i>
IFTA Demographic Information
<i>Accept electronic filing of and payment for IFTA quarterly tax returns</i>
* IFTA Quarterly Tax Filing - <i>pairwise and end-to-end</i>
IFTA Tax Return Correction
IFTA Copy of Tax Return
<i>Retrieve tax rates from IFTA, Inc.</i>
Get IFTA tax rates
<i>Transmit IFTA tax payment information to IFTA Clearinghouse</i>
IFTA Transmittals
<i>Check IFTA Clearinghouse data</i>
IFTA demographic data
IFTA transmittal data

Tests denoted by “*” have been included in the *CVISN Interoperability Test Suite Package, Part 2 - Test Cases and Procedures* (Reference 27). The type of test, pairwise and/or end-to-end, is also indicated for implemented tests.